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NOTE TO EDITORS:

Attached is a copy of a speech given by NASA Administrator Dr. James C. Fletcher to the participants at the Conference on Satellite Communication and Public Service on Dec. 9, 1976, at the Goddard Space Flight Center, Greenbelt, Md.

Mailed:
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Remarks by

Dr. James C. Fletcher
Administrator
National Aeronautics and Space Administration

Conference on Satellite Communication
and Public Service

Goddard Space Flight Center
Greenbelt, Maryland

December 9, 1976

Good morning. I would like to second Dr. Cooper's welcome to NASA's Goddard Space Flight Center. There is no more appropriate setting in which to discuss satellite communication than these surroundings here at Goddard. Goddard is the birthplace of the communications satellite industry. Scientists and technicians working here are responsible for perhaps the longest strides in the field of telecommunications since Alexander Graham Bell unveiled the telephone at the Philadelphia Centennial exactly a century ago.

I am grateful for the opportunity you have given me this morning to share with you some thoughts and perspectives on how we at NASA may work with you and others in the public service community to serve the public better.

First, let's take a look at the status of communications satellites today. In 1945, when Arthur Clarke suggested that a satellite positioned some 22,300 miles above the equator would appear stationary over one spot on Earth, and that three such satellites could "see" virtually the whole globe, many people said it couldn't be done, that we could never launch a spacecraft to that altitude and position it accurately.

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Others argued that even if it could be done, it would be only a technical trick with no practical value.

Today we take these geosynchronous satellites for granted. They are positioned just as Arthur Clarke predicted 30 years ago.

In fact, this, our Bicentennial year, might well be called "The Year of the Communications Satellites." Of NASA's 19 space launches in 1976, 13 have been communications satellites.

Telstar, Early Bird and the other Intelsats: Marisat, Comstar, our Applications Technology Satellite and the Communications Technology Satellite have revolutionized global communications in an incredibly short time.

- Today we have a global satellite system, Intelsat, which is being continuously expanded to meet the rapid growth in demand for satellite services.

- One hundred and seven countries or territories on six continents are utilizing communications satellite services full time.

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● More than a billion people, one of every four persons on Earth, can witness an international event on television -- "live via satellite" -- as it happens.

● A major portion of all long-distance international communications are now carried by satellite.

Communications satellites have more than repaid the cost of their development and launching. As of last July, a telephone call from New York to London was 55 per cent cheaper than before the Early Bird satellite, Intelsat 1, entered service in 1965. A one-hour television transmission between New York and Paris costs 80 per cent less than the charge established for the same transmission by Early Bird. Before satellites, a West Coast-to-Japan cable circuit cost $15,000 a month; today a communications satellite makes the same service available for $4,000.

But satellite communications means much more than a way to do present jobs better, or cheaper, or both. The obvious and exciting versatility of satellite communication today challenges us to take a fresh look at its potential for public service and to act to exploit that potential. I compliment you on your informed interest and your willingness to meet that challenge.

A vital part of the challenge is to communicate needed information to millions of people who do not now have access to it. In our initial efforts to do this with our Applications Technology Satellite (ATS-6) and, more recently, with the Communications Technology Satellite (CTS), we have learned that a basic requirement is the development of small, inexpensive, simply operated Earth stations.

Most present-day satellite communication is handled by common carriers like AT&T and Western Union who integrate their space communications into their existing ground networks. They use a satellite as if it were a long-haul land line, with local and regional service being handled on the ground. This concept makes economic sense because it requires just a few regional ground stations and puts the heavy technical burden on the Earth station rather than the satellite.

If systems are to be tailored to the requirements of the people who will use them, however, the Earth station will not be at a regional redistribution point, but on the roof of, or adjacent to, the facility or institution being served. It needs to sit there and perform, day after day, in all kinds of weather, with little or no attention. It must be inexpensive and reliable. One satellite will serve thousands of such small Earth stations.

This was the concept behind the development of the ATS-6, and CTS which we operate jointly with Canada. These are the forerunners of future generations of communications satellites meeting a wide range of public needs. Because they are powerful and complex spacecraft, their related Earth stations can be simple, cheap and reliable. Those systems have proven their effectiveness in the remote areas of Appalachia, Alaska and the Rocky Mountains in this country; in 4,000 Indian villages and in 27 other developing countries.

We at NASA have been extremely pleased with the accomplishments of such spacecraft. But we are very much aware that it is one thing to develop a successful experimental prototype, and another to provide an operating system which has an acceptable first cost and then performs simply, reliably and economically, day in and day out.

One of our most difficult tasks in accomplishing that transisition has been to reduce the spacecraft complexity and power-to-weight ratio. Every ounce we add to the spacecraft costs additional dollars to get it into orbit. Most people don't realize that a very high percentage of a satellite system's total cost is in getting the spacecraft into position.

For example, a conventional commercial satellite like Western Union's Westar costs about $10 million to build. It costs about $13 million to launch. A heavier, multipurpose satellite like ATS-6, which weighs about 3,000 pounds in its orbital configuration, would have a launch cost of about 50 million in today's dollars.

This is why experimental, high-powered communications satellites are relatively low in channel capacity. In order to build and launch them at a cost that even Federal budgets can afford, we have had to sacrifice some of the size and weight which would provide increased power and capacity.

Given the public service requirement for small, simple, reliable Earth stations, NASA's problem has been to provide larger, more powerful satellites with sufficient channel capacity to make the cost per channel affordable -- and to do so within the constraints of our budget.

I am happy to report that a solution to that problem is close at hand. Early this fall, at our facility in Palmdale, Calif., we rolled out the first of a series of craft that are part spaceship, part airplane: the Space Shuttle Orbiter.

This new craft will be launched like a spacecraft but will land like an airplane. It is a space cargo carrier. It has a bay 15 feet in diameter and 60 feet long with a capacity of 65,000 pounds. The first pre-operational flights will take place in 1979, and within a year thereafter we will be operating Shuttle runs to space on a regular schedule, carrying people and cargo for communications, scientific research, Earth resources inventory, materials processing and other tasks.

The Space Shuttle will change the rules which until now have governed the design of satellites. A payload bay 60 feet long with a capacity of 65,000 pounds enables us to design a spacecraft which weighs about 1,000 pounds per foot of length. Use of the Shuttle will reduce the cost of placing a satellite in orbit from more than half to less than a quarter of the total cost of design, construction and launch.

The Shuttle will make it possible for communications satellites to have multiple frequencies operating at high power, with the satellite positioned very accurately and remaining in service on station for a long time. This combination means that such a satellite could be compatible with existing Earth stations designed for either ATS-6 or CTS.

While a satellite of this type could include new developments in space technology, its size and weight will allow room for redundant systems of proven reliability, so that the spacecraft should have the happy characeteristics of being both innovative and proven.

The implications for public service are spectacular. And by planning now, public service users of this technology can be involved in its development from the very beginning.

While we at NASA are strongly interested in pure science, we also have a mandate to help with the long, hard process of of technological evolution in the fields of aeronautics and space.

Public service is one area where we can provide such help. Requirements in that field, although sometimes out of the ordinary, can frequently be met by satellite technology. But when significant technological innovations are contemplated in such critically important public service areas as education and health care, they are often faced with both administrative and philosophical impediments. Through such mechanisms as your Consortium, both the requirements and the impediments are becoming better understood, and industry is lending a sympathetic ear. Perhaps some people from industry see a new public service market ahead. If so, that's all to the good.

NASA has been trying to aid and abet this process. Along with the Department of Health, Education and Welfare and the White House Office of Telecommunications Policy, NASA encouraged the development of your own Public Service Satellite Consortium, and we have worked with the Consortium staff to learn as much as possible from your preliminary inquiries. We will be following the new, more detailed studies with great interest.

We have also been taking some initiatives on our own. In October the Goddard Space Flight Center sponsored a workshop at which more than 150 experts considered a dozen areas of public service and made recommendations for our future work in communications. A number of you took part in that very constructive conference.

In addition, we have commissioned some independent economic studies and market analyses to help us understand the territory better. And we have given careful hearing to views volunteered by a number of individual public service organizations.

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Eventually, though, what really matters are your specific decisions based on actual experience with well-designed technology. That is why we are offering opportunities to experiment with ATS-6 and CTS, about which you'll be hearing more today.

We are also bringing to bear a NASA mechanism which we call Applications Systems Verification and Transfer, or ASVT. The Consortium operation of the uplink and network control center at Denver is a part of this ASVT program. The idea is to move the technology away from our control and put it in the hands of an organization which responds directly to the people who will be using it. We expect our level of support to decline as users gain experience and the technology advances, until eventually the operation of the Denver facility becomes a normal part of America's public communication systems.

Even as we work together toward regular use of satellites for public service communication, however, I urge you to continue to concentrate on ways in which the space program can best serve the public interest. A moment ago I discussed the implications of the Space Shuttle for communications. It may well be that we have only scratched the surface.

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Consider the implications of a regular, relatively economical cargo carrier to space. About a decade from now -- in the mid-1980s -- the ancient fantasy of the space station should begin to approach reality. We will be able to build increasingly substantial structures in space, capable of generating enormous amounts of power from the Sun and operating for very long periods of time.

What does this mean to public service communications?

It means that very large antennas and high transmitter power in space will make it possible to use receiving dishes on Earth not 30 feet in diameter, or even 10 feet, but the size of your watch crystal.

Studies have been made of a Personal Communications System which involves direct broadcast from a "wrist watch radio" to a high-capacity, multibeam satellite for retransmission to ground communications centrals. The satellite might be 150 feet in diameter with the capacity of handling up to 25,000 switched channels. The ground transmitter could be small and low power, perhaps 1/25 of a milliwatt. With large-scale integrated circuit techniques, the ground transmitter need not cost much more than $10.

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Such a concept allows broad proliferation of ground stations, bringing practical utilization of space systems on an everyday basis to the man-in-the-street.

Vast new programs of scientific research are possible once we can get beyond the constraints of gravity, air, moisture and dust.

Our earthly resources will be understood better and managed better as we develop new generations cf satellites that measure, analyze and collect data.

We can explore new ways of meeting our electrical power requirements, perhaps by power generating stations in space, generating electricity from solar power and relaying it to Earth by microwave.

We can begin to think of processing materials in space, using the unique characteristics of the space environment to serve our need for certain manufactured goods.

Parenthetically, one advantage of industry in space is that it would ease our present pollution problems without creating new ones. Even man is incapable of polluting the infinity of space.

If these developments still seem too much like science fiction, please remember that 10 years in our future is no farther away than 10 years in our past. In fact, since ours is an era of accelerating change, in terms of technological sophistication, 10 years from now is considerably closer than 10 years ago.

- Ten years ago we were wondering if we could really put a man on the Moon.

- Ten years ago the exploration of Mars was generally considered an improbable dream.

- Ten years ago the concept of cheap, easy access to space via a cargo-carrying, reusable Shuttle was almost beyond imagining for most people.

But today the arid vistas of the Moon are crisscrossed with the footprints and tire tracks of American astronauts, a pair of Viking Landers are providing Earth scientists with a huge mass of unique and invaluable data, and Shuttle Orbiter 101 -- a United States spaceship named Enterprise -- has been built and will begin test flights in the atmosphere in a few months.

As this conference is properly concerned with communication, I would urge you as professionals concerned with public service to think about your requirements for surveys of resources, for data collection, for the pursuit of science, for the development of industrial processes, all of which might be served by an imaginative space program that serves public purposes. Not many groups are better qualified than you to help us define those purposes.

Finally, turning again particularly to communications, the National Academy of Engineering's Committee on Satellite Communications, under the chairmanship of Professor Wilbur Davenport of MIT, has urged that NASA pursue a much more vigorous program of research and development in the field of communications, restoring the emphasis of several years ago which resulted in Syncom and the ATS series of innovative communications satellites. The Committee further urges that NASA's R&D activity in communication should be designed to take public service requirements fully into account, with particular stress on a technology transfer program that recognizes the need for a long and carefully structured period during which public service interests can experiment with applications of new technology, demonstrate promising ideas to the field, and then adopt the best of those ideas at a pace that recognizes the administrative realities of public service agencies.

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And so this morning I've tried to share with you a glimpse of a very bright future, a time in which technology makes communication simpler, closer to people who use it, more flexible, more economical and much more closely attuned to the requirements which you identify. To that end, I congratulate the Public Service Satellite Consortium for organizing this meeting and, even more importantly, for launching realistic, detailed studies of public service communication requirements and practical ways to meet those requirements.

I cannot overstress the fact that optimum use of communications satellites for public service depends primarily on the identification of specific requirements by just such interested and constructively active groups as your own.

One hundred years ago, an observer at the Philadelphia Exhibition noted, "Of all the gifts which young America received on its 100th birthday, the telephone proved to be the most valuable." The introduction of communications satellites into space may well be seen by future observers as the most valuable gift given to the world by America during the observation of our 200th anniversary.

AMERICAN REVOLUTION BICENTENNIAL 1776-1976